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EFFICACY OF BOTANICAL CERTAIN INSECTICIDES AGAINST SHOOT AND FRUIT BORER [(*LEUCINODES ORBONALIS* (GUNE.)] ON *KHARIF* SEASON BRINJAL [*SOLANUM MELONGENA* (L.)] UNDER FIELD CONDITION

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ABSTRACT

The present investigation was undertaken entitled Efficacy of certain botanical insecticides against shoot and fruit borer [Leucinodes orbonalis (Gune.)] on kharif season brinjal [Solanum melongena (L.)] under field condition." cultivar i.e. Banarshi round during July to December 2015 at Central Research Farm, MDS Agriculture college Ambikapur (Chhattisgarh).

Three application of six botanical insecticides and one chemical viz; cypermethrin 25 EC (0.006%), Neem oil (4%), NSKE (5%), Pongamia oil (5ml/lit), Iluppai oil (2%), Garlic bulb extract (4%), Tobacco leaf extract (3leaf/lit) were evaluated against shoot and fruit borer, Leucinodes orbonalis. Minimum percent of shoot infestation, percent fruit infestation and B:C ratio were observed in cypermethrin 25 EC with (5.980%, 6.280% and 1:5.25) respectively. Which were followed by Neem oil (6.306%, 6.556% and 1:4.78) < NSKE (6.580%, 7.253% and 1:4.46) < Pongamia oil (7.346%, 7.273%, and 1:3.79) < Iluppai oil (7.656%, 7.793%, and 1:3.68) Garlic bulb extract (8.056%, 8.240% and 1:3.49) < Tobacco leaf extract (8.646%, 8.520% and 1:3.10) <untreated control(water spray) (11.756%,14.923% and 1:2.25) respectively.

KEYWORDS: Benefit Cost Ratio, Botanical Insecticides, Brinjal Shoot and Fruit Borer, Incidence, Leucinodes Orbonalis.

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Original Article

INTRODUCTION

Eggplant (*Solanum melongena* L.) is one of the most important vegetable crops in the Indian subcontinent. The eggplant or aubergine or brinjal (*Solanum melongena* L.) is in South-East Asian countries including India, Bangladesh, Sri Lanka, China, Japan etc. It is a native of Indo-Burma region, and was known to be grown in India since ancient times. Majority of Indians are vegetarian, with a per capita consumption 135 g per day as against the recommended 300 g per day. It is still very less than recommended diet level **(Dhandapani *et al.* 2003).**

Brinjal is normally attacked by number of insect pests right from seeding stage till harvest. Among these pests, shoot and fruit borer *Leucinodes orbonalis* Guenee. (Lepidoptera : pyralidae) is most destructive one infesting the growing shoot just before the flowering stage and continue to infest the fruit after their formation. It is active throughout the year particularly during high temperature and humidity causing great damage to brinjal in South Africa, Congo, Malaysia and India **(Butani and Jotwani 1984).** It is the important limiting factor for successful cultivation of brinjal crop as this pest alone can cause a loss up to 70 per cent in yield. The caterpillar

of *L. orbonalis* is destructive one which borers into young growing shoots, petiole, midrib of leaves and fruits leaving no sign of entry. It riddles the plant parts, feed on internal tissues causing the plant to fade and wither resulting into drying and drooping of growing shoots which is typical symptoms produced. Once the fruit setting begins, the caterpillar bores into the fruit by entering under calyx and feeds inside.

MATERIALS AND METHODS

Preparation of Insecticidal Spray Solution

The insecticidal spray solution of desired concentration as per treatments was freshly prepared every time at the site of experiment just before the start of spraying operations. The quantity of spray materials required for crop was gradually increased as the crop advanced in age.The spray solution of desired concentration was prepared by adoption the following formula:

$$V = \frac{C \times A}{a.i\%}$$

Where,

V= Volume of a formulated pesticide required.

C= Concentration required.

A= Volume of total solution to be prepared.

% a.i. = given Percentage strength of a formulated pesticide.

Efficacy of Treatments

The population of *Leucinodes orbonalis* was recorded before 1 day spraying and on 7th day and 14th day after insecticidal application. The population of shoot and fruit borer had been recorded from 5 plants, randomly selected and tagged from each plot.

Percent Shoot Infestation

Observations were record on the number of infested shoots in each plot a day before spray 7th and 14th days after spraying on selected plants in a plot. The per cent shoot damage was worked syntax using the formula (Number basis).

$$\text{Percent shoot damage} = \frac{\text{Number of infested shoots}}{\text{Total number of shoots}} \times 100$$

Percent Fruit Infestation

Observations were recorded on the number of infested fruits and total number of marketable fruits on selected plants in a plot picking wise. The per cent fruit damage was worked out by using the formula (Number basis),

picking wise. The per cent fruit damage was worked out by using the formula (Number basis)

$$\text{Percent fruit damage} = \frac{\text{Number of damaged fruits}}{\text{Total number of fruits}} \times 100$$

RESULTS

Table 1: Efficacy of Certain Botanical Insecticides Against Shoot and Fruit Borer *Leucinodes Orbonalis* on Brinjal.(on Shoot)

Treatments		1st Spray	2nd Spray	Mean
T_0	Untreated/water spray	22.283	39.648	30.965
		(28.133) *	**(39.003)***	**(33.594) ***
T_1	NSKE (Neemseed kernal extract)	10.283	7.168	8.871
		(18.700) *	**(15.356)***	**(17.114) ***
T_2	Tobacco leaf extract	11.853	8.668	10.265
		(20.124) *	**(17.118)***	**(18.632) ***
T_3	Neem oil	10.100	6.306	8.203
		(18.521) *	**(14.544)***	**(16.539) ***
T_4	Pongamia	10.580	7.529	9.055
		(18.972) *	**(15.919)***	**(17.456) ***
T_5	Garlic bulb extract	11.548	8.113	9.835
		(19.858) *	**(16.166)***	**(18.205) ***
T_6	Iluppai oil	11.076	7.881	9.475
		(19.429) *	**(16.300)***	**(17.870) ***
T_7	Cypermethrin 10 EC (Treated)	9.848	6.260	7.935
		(18.266) *	**(14.212)***	**(16.241) ***
Overall Mean		**12.196**	**11.446**	**11.807**
F- test		S	S	S
S. Ed. (±)		0.762	0.591	5.187
C. D. (P = 0.05)		**1.804**	**1.707**	**12.248**

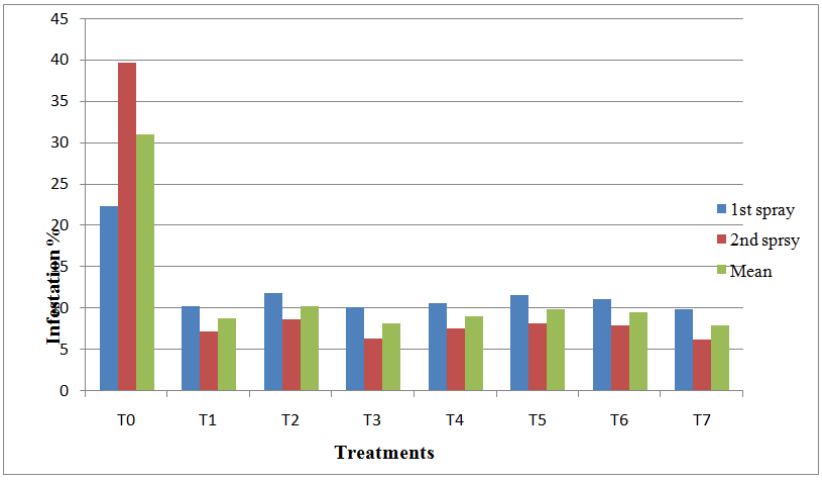

Figure 1

Table 2: Efficacy of Certain Botanical Insecticides Against Shoot and Fruit Borer on Fruit)

Treatments		%Infestation			Overall
		1st Spray	2nd Spray	3rd Spray	Mean
T_0	Untreated/water spray	18.593	26.068	32.776	25.812
		(25.475)*	**(30.690)***	**(34.905)***	**(30.356)***

Table 2: Contd.,					
T_1	NSKE (Neemseed kernal extract)	9.478	9.434	7.703	8.871
		(17.876)*	**(17.864)***	**(16.100)***	**(17.280)***
T_2	Tobacco leaf extract	12.771	12.044	10.970	11.928
		(20.913)*	**(20.303)***	**(19.229)***	**(20.148)***
T_3	Neem oil	8.848	8.178	7.258	8.094
		(17.289)*	**(16.556)***	**(15.608)***	**(16.484)***
T_4	Pongamia	9.869	9.751	8.103	9.241
		(18.298)*	**(18.146)***	**(16.521)***	**(17.655)***
T_5	Garlic bulb extract	11.994	11.611	10.350	11.318
		(20.210)*	**(19.923)***	**(18.668)***	**(19.600)***
T_6	Iluppai oil	11.388	10.724	9.104	10.405
		(9.654)*	**(19.110)***	**(17.514)***	**(15.426)***
T_7	Cypermethrin 10 EC (Treated)	8.344	7.828	6.860	7.677
		(16.759)*	**(16.169)***	**(16.055)***	**(16.327)***
Overall Mean		**11.410**	**11.954**	**11.640**	**11.668**
F- test		S	S	S	S
S. Ed. (±)		0.723	0.670	1.207	2.307
C. D. (P = 0.05)		**1.709**	**1.915**	**2.846**	**4.996**

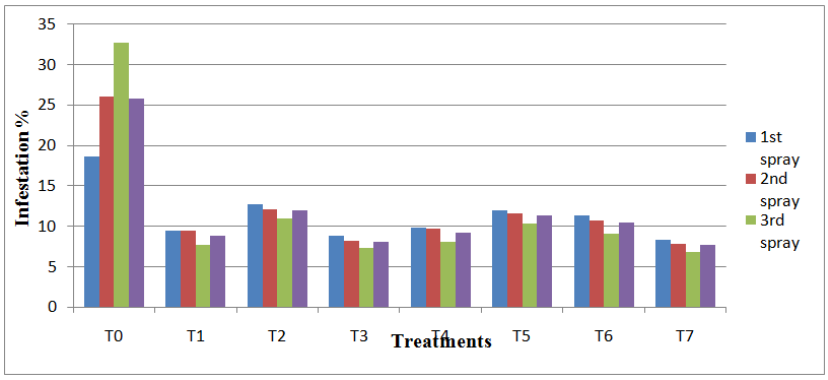

Figure 2: Parenthesis Are Arc Sin Transformed Values

DISCUSSIONS

The data on the percent infestation of shoot borer on overall mean revealed that all the treatments were significantly superior over control. Among all the treatments lowest percent infestation of shoot and fruit borer was recorded in cypermethrin (7.677%) which was par with Neem oil (8.094%). NSKE (8.871%), Pongamia (9.241%), Illuppai (10.405) Garlic bulb extract (9.313%) and tobacco leaf extract (11.923%).

Rahman *et al.* (2014) reported that different treatments Ripcord (cypermethrin) 10 EC @ 1 ml/l of water sprayed after observing 5% level of fruit infestation and repetition of the same at 15 days interval (T_3) performed the best in respect of marketable yield (30.55 t/ha), reduction of fruit infestation over control (77.54%) and also the benefit cost ratio (8.14). also reported that neem oil was the best treatment both in *Kharif* (60.20%) and *Rabi* (59.91%). Among botanical the higher reduction of brinjal shoot and fruit borer infestation was found in the plots treated by neem oil and was most effective and these results were supported by Rahman *et al.*, (2009).

CONCLUSIONS

From the critical analysis of the present finding it can be concluded that shoot and fruit borer (*Leucinodes orbonalis*) population on brinjal increased with maximum temperature and decreased with decline in

maximum temperature during 33rd standard week (August 3rd week) in Allahabad. neem products i.e. neem oil and NSKE were found to be the most effective treatments against shoot and fruit borer. These treatments also given the highest cost benefit ratio under the Allahabad agro climatic conditions. So that times of sowing has to be planned in order to escape from pear infestation of pest. botanical insecticides safe for environment and human health.

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